Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Amendment of Part 90 of the Commission's Rules to Permit Terrestrial Trunked Radio (TETRA) Technology	)	WT Docket No. 11-69
	)	
Request by the TETRA Association for Waiver of Sections 90.209, 90.210 and 2.1043 of the Commission's Rules	)	ET Docket No. 09-234

To: The Commission

COMMENTS OF HARRIS CORPORATION

Harris Corporation ("Harris") respectfully submits these comments in response to the Federal Communications Commission's ("Commission") Notice of Proposed Rulemaking and Order[1] ("NPRM & Order") granting a partial waiver award to TETRA Association that permits certification, manufacture and use of Terrestrial Trunked Radio ("TETRA") equipment[2] and seeking comment on proposed technical rules that would enable digital technologies like TETRA to operate without causing interference and the effect of TETRA deployments on public safety interoperability.[3]

Harris urges the Commission to continue its policy to mitigate interference whenever possible before it determines that granting TETRA Association's waiver request serves the public interest. TETRA Association addresses only adjacent channel interference issues in its

[1] *See In re* Amendment of Part 90 of the Commission's Rules to Permit Terrestrial Trunked Radio (TETRA) Technology Request by the TETRA Association for Waiver of Sections 90.209, 90.210 and 2.1043 of the Commission's Rules, *Notice of Proposed Rulemaking and Order*, WT Docket No. 11-69, ET Docket No. 09-235 (rel. Apr. 26, 2011) ("NPRM & Order").

[2] *See id.* ¶ 16.

[3] *See id.* ¶ 8.

waiver request, and does not disclose analysis of other sources of interference. The NPRM & Order did not seek information about predominant interference sources, which is inconsistent with the Commission's prior rulemaking on this subject.[4] Accordingly, the Commission must characterize TETRA technology as a "high density cellular system" and ensure compliance with the applicable rules and policies from the 2004 Interference Report and Order ("2004 Interference R&O").

Harris believes the use of TETRA technology in the Public Safety Pool frequencies will increase interoperability challenges because TETRA technology is not compatible with Project 25 (P25) systems being widely deployed today. The Commission cannot ensure or achieve interoperability between TETRA technology and public safety networks. Harris supports the Commission's adoption of its proposed rules regarding authorized bandwidth and emissions masks.

Harris also supports the Commission's objectives to ensure access to spectrally efficient digital technologies for land mobile users, particularly in light of on-going spectrum efficiency mandates. Standardized, low cost, spectrally-efficient technologies are being deployed in the U.S. today. Specifically, products & systems based on the European Technical Standards Institute (ETSI) Digital Mobile Radio (DMR) standard are deployed rapidly in the United States today. DMR products meet 6.25 kHz equivalent spectrum efficiency, comply with current Commission Part 90 rules governing narrowband technology, and are available with attractive

[4] *See In re* Improving Public Safety Communications in the 800 MHz Band Consolidating the 800 and 900 MHz Industrial/Land Transportation and Business Pool Channels Amendment of Part 2 of the Commission's Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, including Third Generation Wireless Systems Petition for Rule Making of the Wireless Information Networks Forum Concerning the Unlicensed Personal Communications Service Petition for Rule Making of UT Starcom, Inc. Concerning the Unlicensed Personal Communications Service Amendment off Section 2.106 of the Commission's Rules to Allocate Spectrum at 2 GHz for use by the Mobile Satellite Service, *Report and Order, Fifth Report and Order, Fourth Memorandum Opinion and Order, and Order*, 19 F.C.C.R. 14969 (rel. Aug. 6, 2004) ("2004 Interference R&O")

price points. Indeed, many of the benefits claimed by the Commission for enabling TETRA technology are already realized with DMR. As a further matter, DMR operates in channel plans based on 12.5 kHz spacing, making it compatible with channel plans being implemented as part of the 12.5 kHz efficiency mandates. TETRA technology is not compatible with 12.5 kHz channel plans, further complicating frequency coordination activities in bands that will largely be based on 12.5 kHz channel spacing.

Harris is an international communications and information technology company, serving government and commercial markets in more than 150 countries. Harris is a leading technology developer and manufacturer of mission critical wireless communications for the public safety communications market. Harris is committed to providing public safety with solutions to achieving true nationwide interoperability through combining its leading Internet Protocol ("IP") based technology and in-depth knowledge of mission critical requirements. Harris is also an active member of numerous standards and technical committees including the Telecommunications Industry Association ("TIA"), the Emergency Response and Interoperability Center's ("ERIC") Public Safety Advisory Committee ("PSAC"), the National Public Safety Telecommunications Council ("NPSTC"), and Telecommunications Council, and the Alliance for Telecommunications Industry Solutions ("ATIS"). Harris offers first responders full-spectrum multiband products for joint public safety operations on the local, state, and federal levels.

I. OPERATING TETRA IN PUBLIC SAFETY BANDS POSES AN UNACCEPTABLE INTERFERENCE RISK

The evidence in the NPRM & Order and TETRA's waiver request[5] does not demonstrate that TETRA technology provides sufficient interference protection to other technologies. The Commission notes that TETRA technology has lower interference potential than analog FM and P25 Phase 1 transmitters because of the TETRA Association's Adjacent Channel Power Ratio ("ACPR") analysis.[6] Harris agrees with the Commission that ACPR information is "useful" to decide relative interference potential.[7] However, a fact which the waiver request and NPRM & Order do not recognize is that adjacent channel interference is just one type of interference that a system can generate.

Harris has concerns that the Commission's decision to grant TETRA Association's waiver request does not reflect the insight gained from the 800 MHz proceedings. The Commission did not initially evaluate a broad scope of possible interference scenarios in the 800 MHz band. In 2004, the Commission reconfigured the 800 MHz band largely to alleviate interference to public safety communications[8] by addressing multiple sources of interference with mandatory interference-abatement rules and Enhanced Best Practices.[9] Specifically, the Commission identified that public safety and other 800 MHz non-cellular systems encounter two prevalent types of interference: (1) intermodulation interference and (2) out-of-band emission ("OOBE") interference.[10] The Commission adopted its new rules and policies with the expectation that 800 MHz licensees would anticipate and avoid sources of interference that

[5] *See* TETRA Association, *Request for Waiver of Sections 90.209, 90.210, and 2.1043*, ET Docket No. 09-234 (filed Nov. 20, 2009) ("TETRA Waiver Request").

[6] *See* NPRM & Order, ¶ 9.

[7] *See id.*

[8] *See* 2004 Interference R&O ¶ 13, 22, 331

[9] *See id.* ¶¶ 14, 16, 88.

[10] *See id.* ¶ 89.

contribute to intermodulation and OOBE interference before interference occurs.[11] Here, the NPRM & Order discusses only OOBE interference sources, and overlooks the importance of analyzing intermodulation interference.[12] TETRA's waiver request also did not address intermodulation interference.[13] Before the Commission can conclude that TETRA technology poses no interference risk, the Commission should ensure compliance with the Commission's defined standard of unacceptable intermodulation interference in the 800 MHz band.[14]

II. THE COMMISSION MUST CHARACTERIZE TETRA TECHNOLOGY AS A "HIGH DENSITY CELLULAR SYSTEM"

The Commission should continue to restrict the use of TETRA technology to avoid near-far interference. Assuming that the Commission proceeds with broader licensing of TETRA technology after an interference analysis is complete, the Commission must adopt the definition "high density cellular system" applicable to Enhanced Special Mobile Radio ("ESMR") for TETRA technology.[15]

Intermodulation becomes a factor when "high density cellular systems" operate in the same band as high profile low density land mobile radio ("LMR") systems. This was particularly a problem for Nextel iDEN systems, which precipitated the 800 MHz rebanding process.[16] TETRA technology shares two important characteristics with iDEN, cellular-like

[11] *See id.* ¶ 115.

[12] *See generally* NPRM & Order ¶¶ 9-12.

[13] *See generally* Tetra Waiver Request at 7-9, Attachment A.

[14] *See* 47 C.F.R. §§ 90.672-73 (2010). *See also* 2004 Interference R&O at 223-25.

[15] NPRM & Order ¶ 12.

[16] *See* 2004 Interference R&O ¶ 2.

deployment and non-constant envelope transmitters. Due to the similarities with iDEN, the Commission should adopt the same characterization and regulations for TETRA technology.

Operators of "high density cellular systems" are required to analyze all sources of interference before seeking authorization to operate in a non-cellular portion of the 800 MHz band.[17] The Commission's rationale for this requirement was twofold. First, a comprehensive interference analysis allows the Commission to gauge the effect of high density architecture on non-cellular systems before serious harm can be done.[18] Secondly, the Commission concluded it would have invited "inference-generating systems in incompatible spectrum and potentially put our first responders at risk" if it weren't for a comprehensive interference assessment.[19] The public interest is only served if potential interference sources are analyzed before TETRA technology is used in all public safety bands, including the 800 MHz band, similar to the Commission's decision regarding ESMR in 2004.[20] In other words, the Commission may be authorizing a system that interferes with critical public safety communications if it fails to ensure compliance with its interference abatement rules and policies in each band which TETRA technology is deployed.

III. USE OF TETRA TECHNOLOGY IN THE PUBLIC SAFETY POOL FREQUENCIES WILL INCREASE INTEROPERABILITY CHALLENGES

Harris supports the Commission's decision to limit use of TETRA technology to the Industrial/Business Pool frequencies in the 450-470 MHz band and ESMR frequencies in the 800

[17] *See* 47 C.F.R. § 90.7 (2009).

[18] *See* 2004 Interference R&O ¶ 173.

[19] *See id.*

[20] *See id.* ¶ 7.

MHz band.[21] While the Commission should adopt a technologically neutral position with respect to general use channels, all equipment licensed for public safety use must implement mutual aid capabilities in the respective bands where it is licensed to operate. TETRA technology employs an incompatible channel access method with many P25 technology deployments and other narrowband and broadband public safety communications systems.[22] As a result, use of TETRA technology in the Public Safety Pool frequencies will increase interoperability challenges.

Interoperability cannot be achieved between the public safety communications systems that already exist or are currently being deployed and systems using TETRA technology. To prevent any impairment of public safety interoperability, the Commission should ensure compliance with the technical limitations adopted for ESMR in the 2004 Interference R&O on the deployment of TETRA technology.

IV. THE COMMISSION SHOULD ADOPT ITS PROPOSED RULES CONCERNING AUTHORIZED BANDWIDTH AND EMISSION MASKS

Harris agrees that the Commission's proposed rules regarding authorized bandwidth and emission masks for TETRA technology do not pose adjacent channel interference risks. Interference can be mitigated if the Commission adopts its proposed amendment to authorize bandwidth in the twenty-five kHz channel to be increased to twenty-two kHz for devices that comply with the more stringent TETRA adjacent channel power ("ACP") limits.[23] Harris believes the Commission can similarly permit TETRA equipment to comply with the ACP limits as an alternative to emission masks.[24]

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[21] NPRM & Order ¶ 19.

[22] *Id.* ¶¶ 14-15.

[23] *Id.* ¶ 10.

[24] *Id.* ¶ 11.

V. Conclusion

For the foregoing reasons, Harris requests the Commission to adopt the recommendations detailed above.

Respectfully Submitted,

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/s/

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